POSITIONS AND AREAS OF SUN SPOTS—Continued

| Date | Eastern standard time | Mount Wilson group number | Heliographic: Diff. in longitude | Heliographic: Longitude | Heliographic: Latitude | Area: Spot | Area: Group | Total area for each day | Observatory |
|---|---|---|---|---|---|---|---|---|---|
| 1937 | h. m. | | ° | ° | ° | | | | |
| July 23 | 11 12 | 5477 | −64.0 | 359.3 | +30.0 | | 1309 | | U. S. Naval. |
| | | 5474 | −19.0 | 44.3 | −21.0 | 36 | | | |
| | | 5476 | −5.0 | 58.3 | +10.5 | | 97 | | |
| | | 5472 | +1.0 | 64.3 | −14.0 | | 582 | | |
| | | 5471 | +8.5 | 71.8 | +7.5 | 24 | | | |
| | | 5469 | +39.0 | 102.3 | −21.0 | 97 | | | |
| | | 5467 | +48.0 | 111.3 | +14.0 | 36 | | | |
| | | 5465 | +59.0 | 122.3 | −15.0 | | 36 | | |
| | | 5463 | +69.0 | 132.3 | +13.0 | | 533 | 2,750 | |
| July 24 | 11 11 | 5477 | −51.0 | 359.1 | +30.5 | | 1503 | | |
| | | 5476 | +9.0 | 59.1 | +10.0 | | 121 | | Do. |
| | | 5472 | +13.0 | 63.1 | −14.5 | | 485 | | |
| | | 5471 | +21.0 | 71.1 | +7.5 | 12 | | | |
| | | 5469 | +51.0 | 101.1 | −21.0 | 97 | | | |
| | | 5463 | +85.0 | 135.1 | +12.0 | | 533 | 2,751 | |
| July 25 | 13 32 | 5477 | −37.5 | 358.1 | +30.5 | | 2182 | | Do. |
| | | 5479 | −17.5 | 18.1 | +15.5 | | 24 | | |
| | | 5478 | +21.0 | 56.6 | −19.0 | 16 | | | |
| | | 5476 | +24.0 | 59.6 | +9.5 | | 242 | | |
| | | 5472 | +28.0 | 63.6 | −15.0 | | 485 | | |
| | | 5469 | +65.0 | 100.6 | −21.0 | 97 | | 3,046 | |
| July 26 | 12 20 | 5481 | −82.0 | 300.9 | +29.5 | 242 | | | Do. |
| | | 5477 | −25.0 | 357.9 | +31.0 | | 2763 | | |
| | | 5479 | −4.0 | 18.9 | +15.0 | | 48 | | |
| | | 5478 | +35.0 | 57.9 | −18.5 | 6 | | | |
| | | 5476 | +38.5 | 61.4 | +9.5 | | 194 | | |
| | | 5472 | +41.0 | 63.9 | −14.0 | | 679 | | |
| | | 5469 | +79.0 | 101.9 | −21.0 | 97 | | 4,029 | |
| July 27 | 11 13 | 5483 | −79.0 | 291.4 | −12.0 | | 291 | | Do. |
| | | 5481 | −70.0 | 300.4 | +29.0 | 194 | | | |
| | | 5477 | −13.0 | 357.4 | +31.0 | | 2763 | | |
| | | 5479 | +9.0 | 19.4 | +15.0 | | 36 | | |
| | | 5476 | +51.0 | 61.4 | +9.0 | | 242 | | |
| | | 5472 | +55.0 | 65.4 | −15.0 | | 679 | 4,205 | |
| July 28 | 11 7 | 5484 | −68.0 | 289.2 | +7.0 | 24 | | | Do. |
| | | 5483 | −65.0 | 292.2 | −12.0 | | 388 | | |
| | | 5481 | −59.0 | 298.2 | +29.0 | 194 | | | |
| | | 5485 | −54.0 | 303.2 | −22.0 | | 24 | | |
| | | 5477 | −1.0 | 356.2 | +33.0 | | 2521 | | |
| | | 5479 | +22.5 | 19.7 | +15.0 | | 36 | | |
| | | 5476 | +65.0 | 62.2 | +10.0 | | 194 | | |
| | | 5472 | +68.0 | 65.2 | −15.0 | | 533 | 3,914 | |
| July 29 | 11 26 | 5486 | −70.0 | 273.8 | −17.0 | | 145 | | Do. |
| | | 5484 | −53.0 | 290.8 | +7.0 | 6 | | | |
| | | 5483 | −52.0 | 291.8 | −11.0 | | 533 | | |
| | | 5481 | −46.0 | 297.8 | +29.0 | 242 | | | |
| | | 5485 | −39.0 | 304.8 | −21.0 | | 97 | | |
| | | 5477 | +3.0 | 346.8 | +34.0 | | 1406 | | |
| | | 5477 | +19.5 | 3.3 | +29.0 | | 1115 | | |
| | | 5479 | +40.0 | 23.8 | +14.0 | 12 | | | |
| | | 5476 | +74.0 | 57.8 | +9.0 | 194 | | | |
| | | 5472 | +79.0 | 62.8 | −15.0 | | 485 | 4,235 | |
| July 30 | 11 6 | 5489 | −80.0 | 250.8 | +24.0 | | 970 | | Do. |
| | | 5487 | −56.0 | 274.8 | +15.0 | 16 | | | |
| | | 5486 | −55.5 | 275.3 | −15.5 | | 73 | | |

POSITIONS AND AREAS OF SUN SPOTS—Continued

| Date | Eastern standard time | Mount Wilson group number | Heliographic: Diff. in longitude | Heliographic: Longitude | Heliographic: Latitude | Area: Spot | Area: Group | Total area for each day | Observatory |
|---|---|---|---|---|---|---|---|---|---|
| 1937 | h. m. | | ° | ° | ° | | | | |
| July 30 | 11 6 | 5484 | −39.5 | 291.3 | +8.5 | 24 | | | |
| | | 5483 | −38.0 | 292.8 | −11.0 | | 388 | | |
| | | 5481 | −34.0 | 296.8 | +30.0 | 194 | | | |
| | | 5485 | −28.0 | 302.8 | −21.0 | | 73 | | |
| | | 5477 | +16.0 | 346.8 | +33.5 | | 1406 | | |
| | | 5477 | +34.0 | 4.8 | +29.5 | | 1067 | | |
| | | 5479 | +54.0 | 241.8 | +14.0 | 16 | | 4,227 | |
| July 31 | 13 6 | 5489 | −66.0 | 250.5 | +23.0 | | 1454 | | U. S. Naval. |
| | | 5488 | −64.0 | 252.5 | +30.0 | 194 | | | |
| | | 5487 | −42.0 | 274.5 | +15.0 | | 73 | | |
| | | 5486 | −41.0 | 275.5 | −14.0 | | 85 | | |
| | | 5484 | −25.0 | 291.5 | +8.0 | 48 | | | |
| | | 5483 | −22.0 | 294.5 | −11.0 | | 388 | | |
| | | 5481 | −20.0 | 296.5 | +30.0 | 194 | | | |
| | | 5485 | −11.0 | 305.5 | −21.0 | | 73 | | |
| | | 5477 | +29.5 | 346.0 | +34.0 | | 1309 | | |
| | | 5477 | +48.0 | 4.5 | +29.5 | | 970 | 4,788 | |

Mean daily area for 31 days, 3,256.

## PROVISIONAL SUNSPOT RELATIVE NUMBERS, JULY 1937

[Dependent along on observations at Zurich and its station at Arosa]

[Furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

| July 1937 | Relative numbers | July 1937 | Relative numbers | July 1937 | Relative numbers |
|---|---|---|---|---|---|
| 1 | *a* 69 | 11 | *Wac* 202 | 21 | 150 |
| 2 | *Ec* 91 | 12 | *ad* 223 | 22 | *d* 145 |
| 3 | 74 | 13 | *a* 188 | 23 | *a* 139 |
| 4 | *Mcd* 65 | 14 | *aad* 215 | 24 | 126 |
| 5 | 91 | 15 | *a* 204 | 25 | 124 |
| 6 | *Ecd* 108 | 16 | | 26 | *d* 115 |
| 7 | *a* 143 | 17 | *d* 152 | 27 | *d* 143 |
| 8 | *Wcd* 185 | 18 | *b* 167 | 28 | *b* 124 |
| 9 | *bd* 181 | 19 | *a* 155 | 29 | *Ebc* 128 |
| 10 | 192 | 20 | *Ec* 149 | 30 | *d* 139 |
| | | | | 31 | 131 |

Mean, 30 days=143.9.

*a*=Passage of an average-sized group through the central meridian.
*b*=Passage of a large group or spot through the central meridian.
*c*=New formation of a group developing into a middle-sized or large center of activity; *E:* on the eastern part of the sun's disk, *W:* on the western part, *M:* in the central circle zone.
*d*=Entrance of a large or average-sized center of activity on the east limb.

# AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE, *In Charge*]

By LOYD A. STEVENS

Mean free-air data, based on airplane weather observations made during the month of July 1937, are given in tables 1 to 3.

The mean free-air temperatures were generally below normal at all levels over the region east of the Rocky Mountains and near normal or slightly above elsewhere. The greatest negative departures occurred over Wright Field in the lower levels (−3.9° C. at 2 kilometers) and over Norfolk in the higher levels (−3.7° C. at 5 kilometers). The greatest positive departure (+2.0° C.) occurred over Spokane at 1 kilometer. The highest temperatures occurred over Oklahoma City at 0.5 and 1 kilometer, and over El Paso from 1.5 to 5 kilometers. At 5 kilometers, however, the temperature over El Paso was only 0.1° C. higher than over San Diego. There was, therefore, a gradual shifting of the statistical center of highest temperatures, toward the west, with altitude. There were two statistical centers of low temperatures located over Seattle and Sault Ste. Marie, respectively; the former having the lower temperatures at all levels except at 5 kilometers where they were equal in value. In general the mean free-air temperatures for July were higher at all levels than in June by 3° to 6° C. over the northern part of the country and by 1° C. over the extreme southern part. The greatest increase occurred at Oakland at 1 kilometer where the temperature for July (24.7° C.) was 8.2° C. higher than that for June (16.5° C.). At Kelly Field, however, the temperatures for July were slightly lower than for June at all levels above 1 kilometer. The same was true at Barksdale Field above 2 kilometers.

The mean free-air relative humidities at all levels were, in general, above normal over the northern part of the country east of the Rocky Mountains and below normal over the western Rocky Mountains and Pacific coast regions and in portions of the southeastern part of the country. The greatest negative departures (−10 percent) occurred over El Paso from 1.5 to 2.5 kilometers and the greatest positive departure (+12 percent) occurred over Norfolk at 3 kilometers.

The mean free-air barometric pressures and equivalent potential temperatures for the month are shown in table 3. In general there was an increase in the average pressure